

A Systems Approach to Making Safety Pay



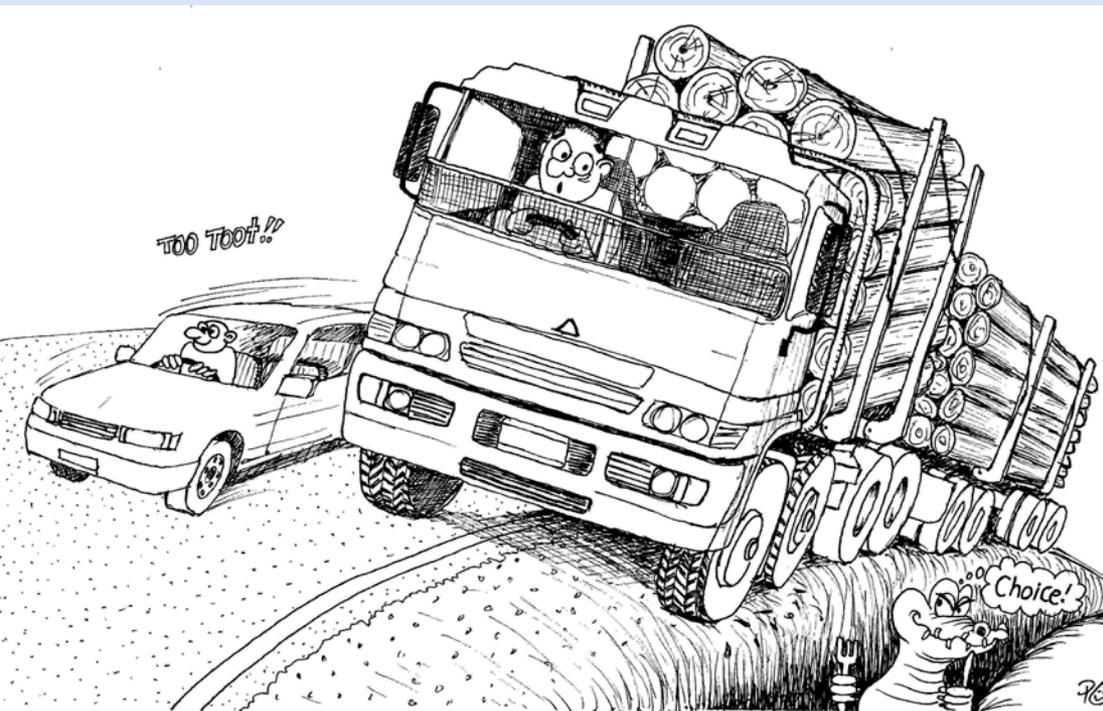
Peter Baas



Cause versus contributing factors

- Human error major cause of most crashes
- Vehicle, road and human contributing

factors determine if crash will occur and its severity





Person centred approach

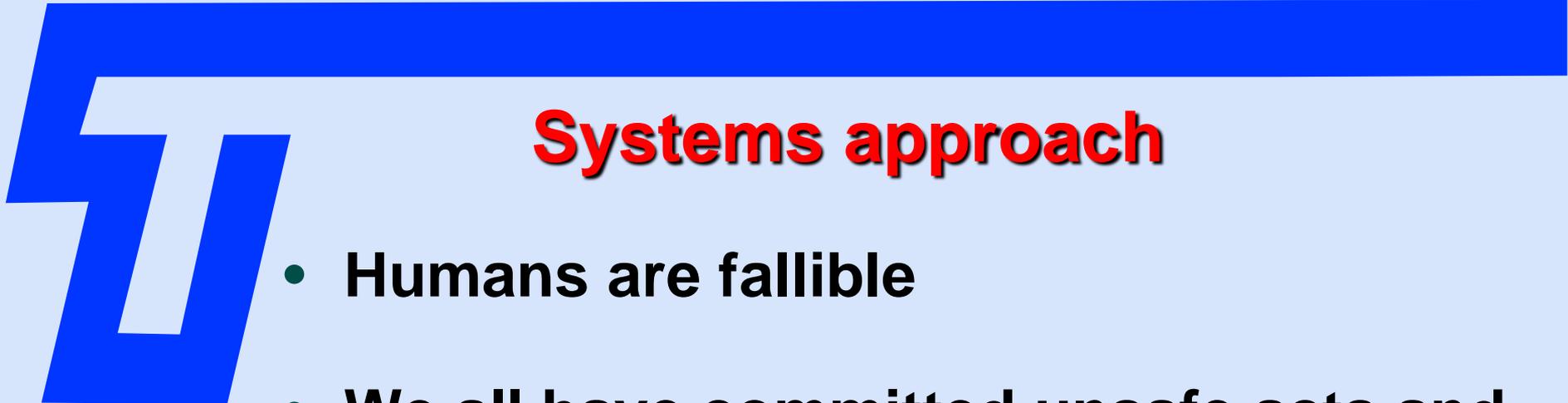
- **Focuses on unsafe acts committed by people at the sharp end**
- **unsafe acts including:**
 - **in-attention**
 - **carelessness**
 - **recklessness**
- **Treats drivers as free agents capable of choosing between what is safe and unsafe**

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Person centred approach to crash reduction

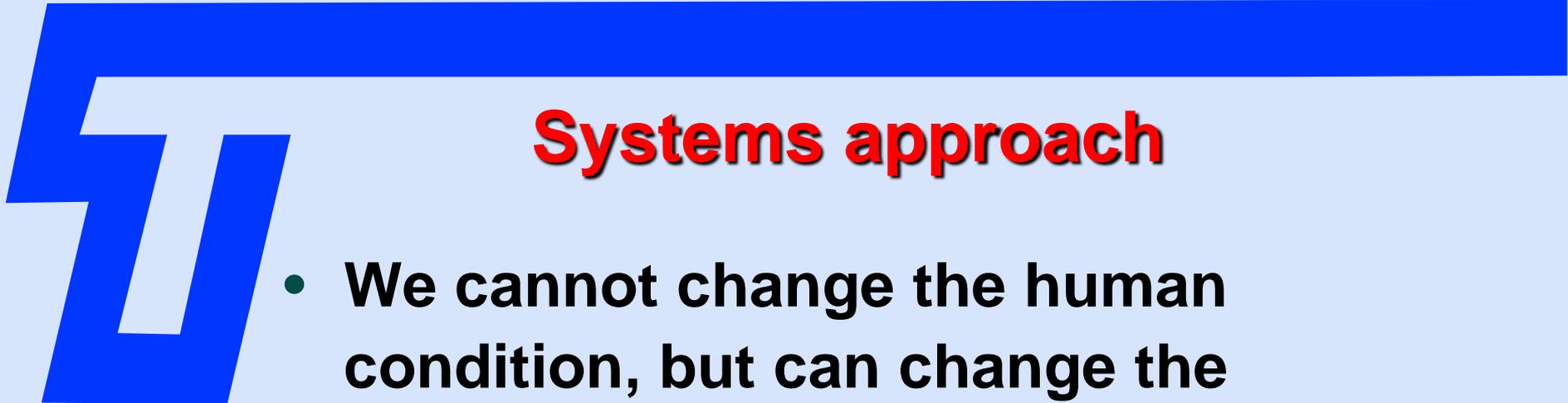
- **Increased Police enforcement**
- **Harsher penalties**
- **Advertising campaigns focused on fear**
- **Stricter rules and regulations**
- **Retraining**

Legally convenient

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Systems approach

- **Humans are fallible**
- **We all have committed unsafe acts and make errors to varying degrees**
- **Even the best equipment breaks down and deteriorates**
- **Only very small proportion of truck drivers are wilfully reckless**

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Systems approach

- **We cannot change the human condition, but can change the conditions under which humans work**
- **Defences required to reduce risk of mistakes or failures occurring**
- **Systems approach being used in aviation, medicine and many other industries**

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Risk reduction

Chances of making a mistake or error that could result in a crash are dependent on:

- **safety systems employed by operator**
- **roads being driven on**
- **vehicle condition and performance**
- **external pressures on drivers**

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Management systems

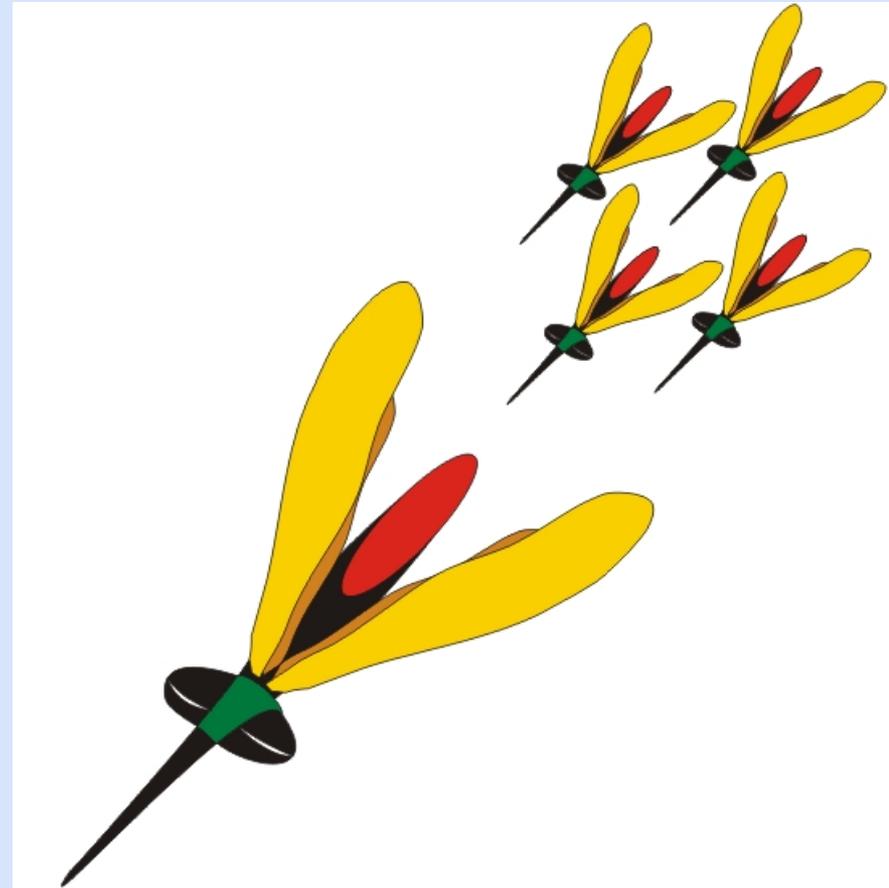
The management of a transport operation:

- **selects the drivers**
- **provides or arranges training**
- **sets the standards of behaviour**
- **selects the vehicles**
- **sets maintenance standards**
- **sets schedules and rosters**
- **sets priorities**
- **determines company culture**

Person centred versus systems approaches

Failures like mosquitoes

- Swat them one at a time
or
- Drain the swamp





Operator Safety Rating Scheme

Primary aim is to improve safety by encouraging transport operators to take greater responsibility for safety

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Lifting the game

- **Currently only top 5% have good systems in place to manage safety**
- **Need to encourage the middle group to improve**
- **There will always be some bottom feeders that need the stick approach**

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Systems approach does work

- **US studies have found that operators that do not investigate crashes and take no action were found to have have 9 times crash rate of those that do.**
- **Those unfamiliar with driving hours and kept no records had crash rates 30% higher than those that did.**

(Moses and Savage)



Operator Safety Rating Scheme

- **Ratings (superior to unsatisfactory)**
- **Monitoring (exposure and safety data)**
- **Targeted enforcement**
- **Audits**
- **Industry standards**
- **Incentives and disincentives**



Operator obligations

- **Responsibility:** *Must ensure vehicles are properly maintained, and competent, qualified drivers are behind the wheel*
- **Education:** *Everyone is trained or receiving training for the task they are expected to undertake*
- **Monitoring:** *Ensure vehicle maintenance, driver management and other safety policies are in place and monitored*
- **Action:** *Operator must take corrective action if policies and procedures not adequate or followed*



Industry standards

- **Driver:** *on-road behaviour, traffic offences and infringements, health, fatigue, licences, training*
- **Company management:** *management of policies and procedures, client and subcontractor arrangements, continuous improvement*
- **Use of vehicle:** *scheduling, load securing, mass & dimensions*
- **Vehicle condition:** *roadworthiness, performance and design*
- **Crash investigation:** *as a means of learning from mistakes*



Roadworthiness

- **Why we need a roadworthiness industry standard**
- **What will be in the roadworthiness industry standard**



Vehicle defects

- **Catastrophic failure causing crash (e.g. tyre blowout or drive-line failure). Typically results in single vehicle crash**
- **Performance reduction contributing to crash (e.g. poorly adjusted brakes limiting truck's ability to avoid a crash or to reduce its severity)**
- **Catastrophic failure contributing to crash (e.g. component failure while under pressure during evasive manoeuvre)**

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Crash investigation

- **Often very difficult to determine whether a vehicle defect contributed**
- **The presence of a defect does not mean it necessarily contributed**
- **Reporting of vehicle defects very dependent on depth of investigation and expertise of investigator**

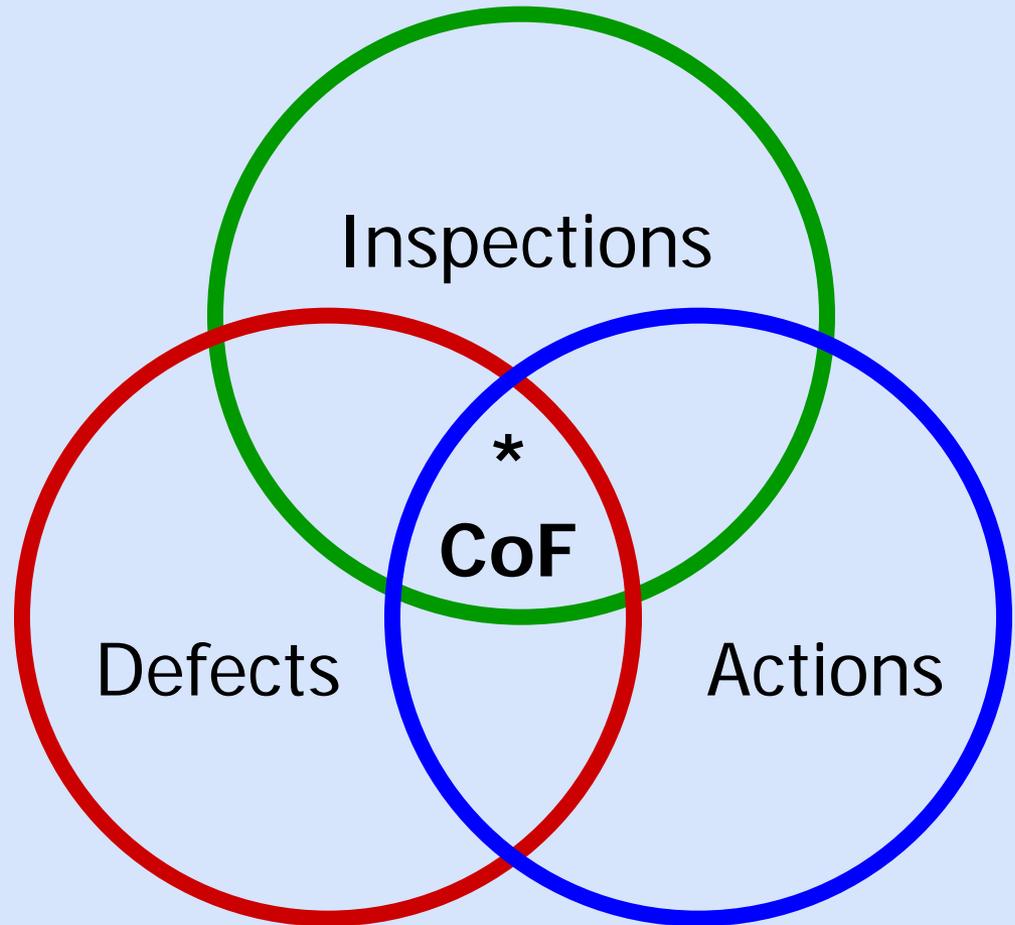


Proportion of crashes with vehicle defects as significant factor

- **3% to 8% - Police investigations**
- **13% - Specialist crash investigators**
 - **Brakes 6%**
 - **Tyres 2%**
 - **Chassis 1.5%**
 - **Lights and indicators 1%**
 - **Steering 0.7%**
 - **Cab components 0.7%**

Vehicle inspection

Inspections only
reduce the
probability of a
serious defects
being present

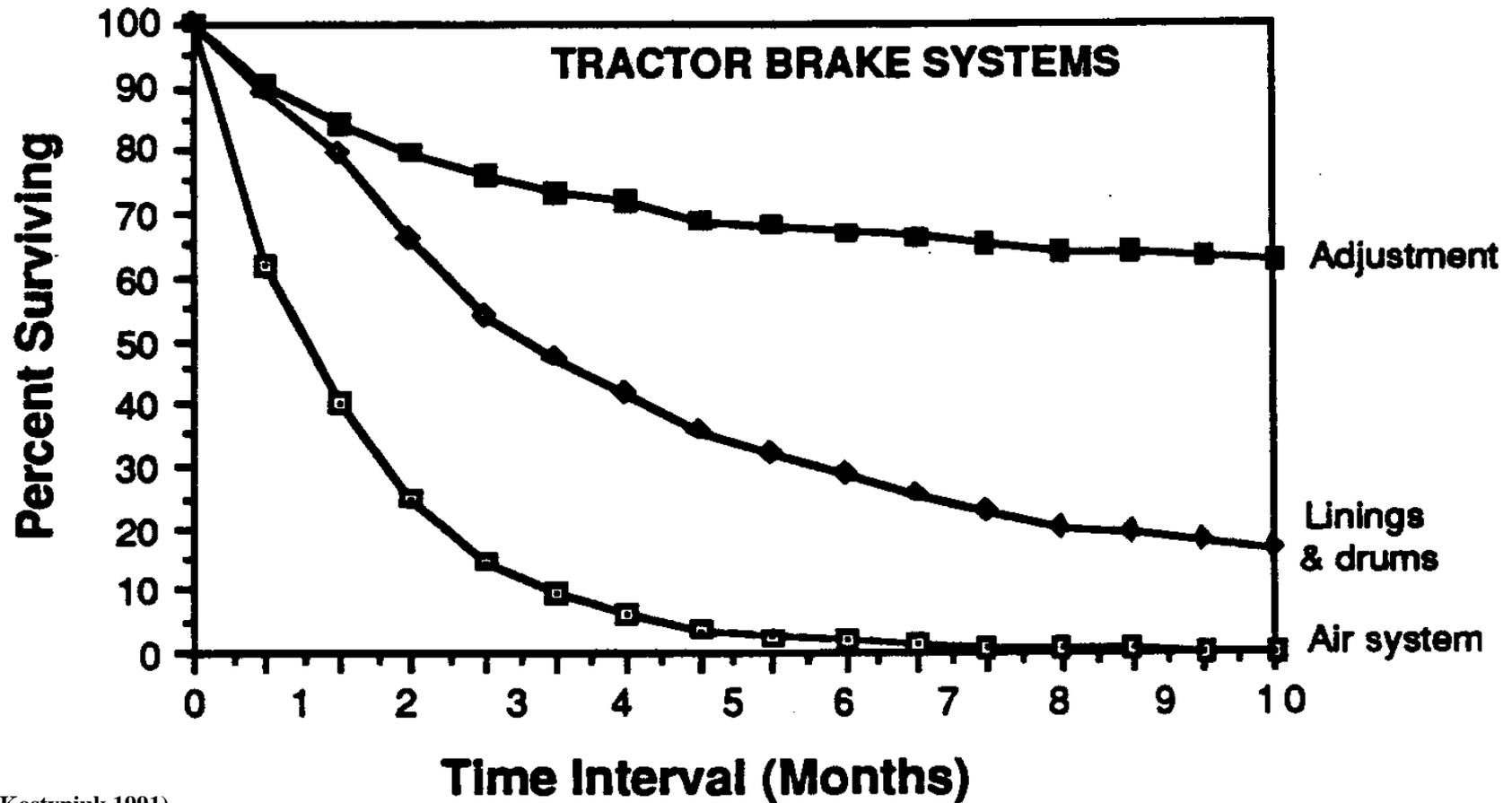


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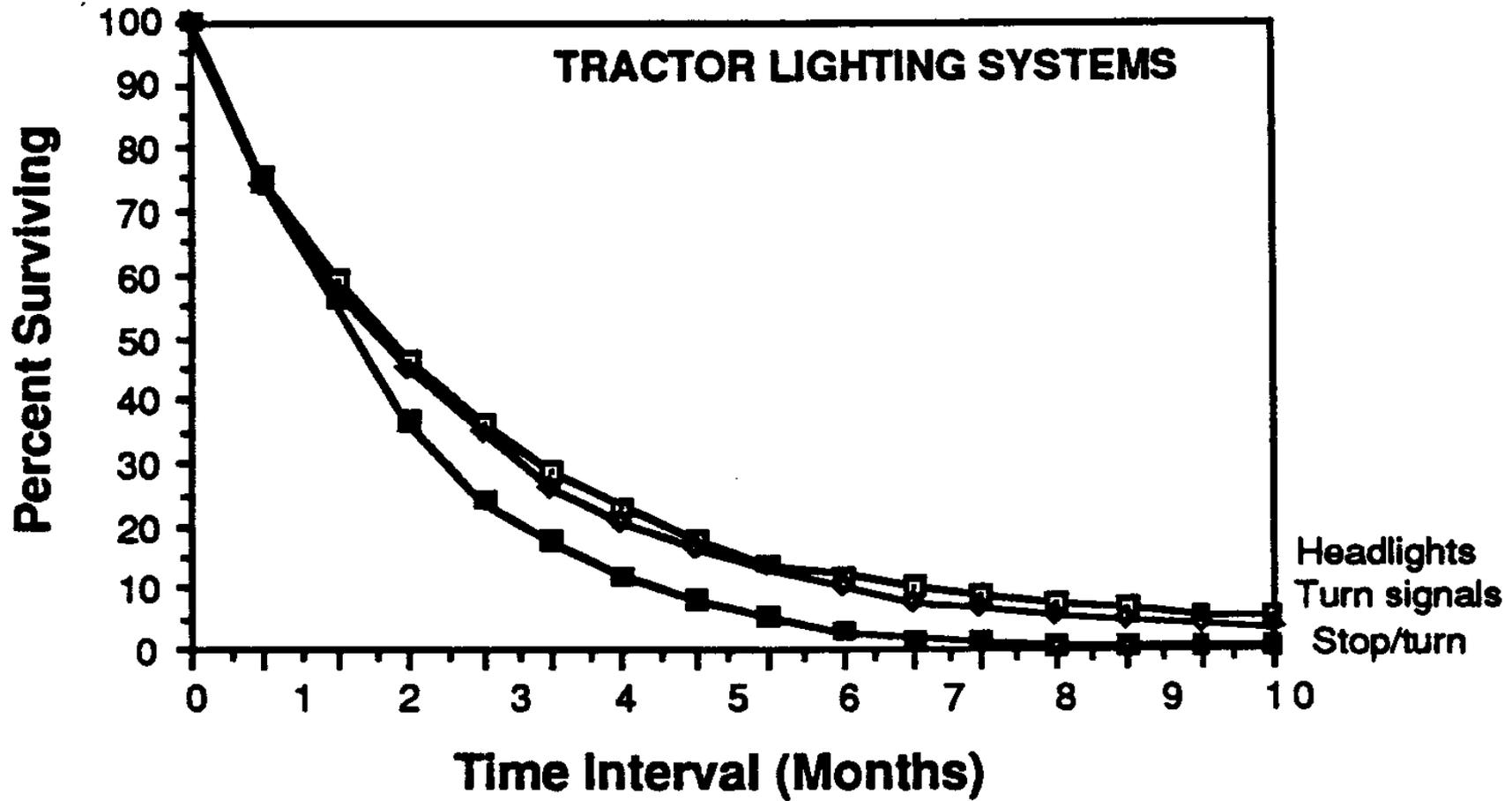
Time to failure after inspection

- **Passing an inspection is no guarantee that a vehicle will be defect-free once it is put back into service**
- **Highly likely that a heavy vehicle will develop an out of service (red-sticker) fault within 3 months of an inspection**

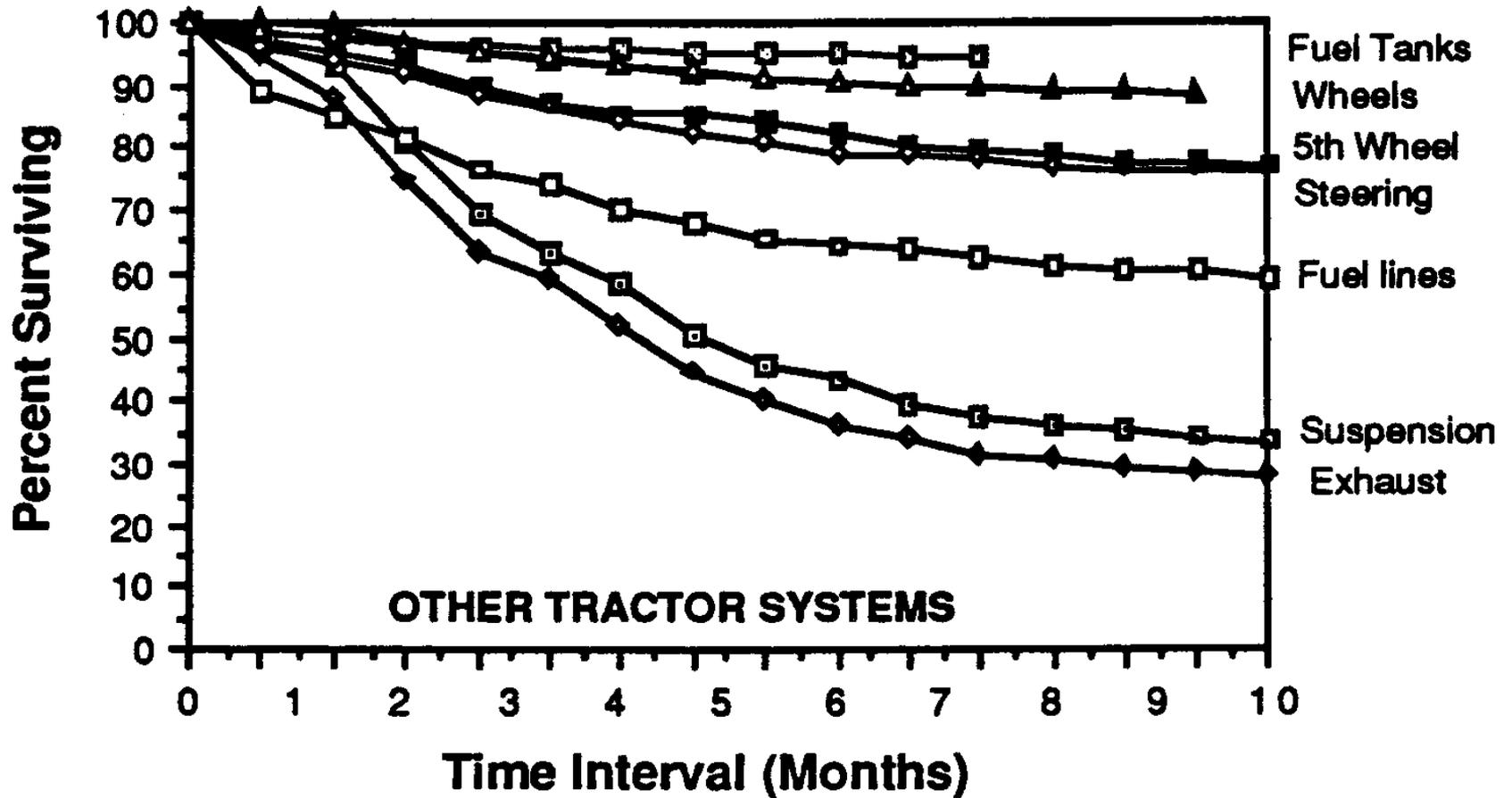
Tractor brakes



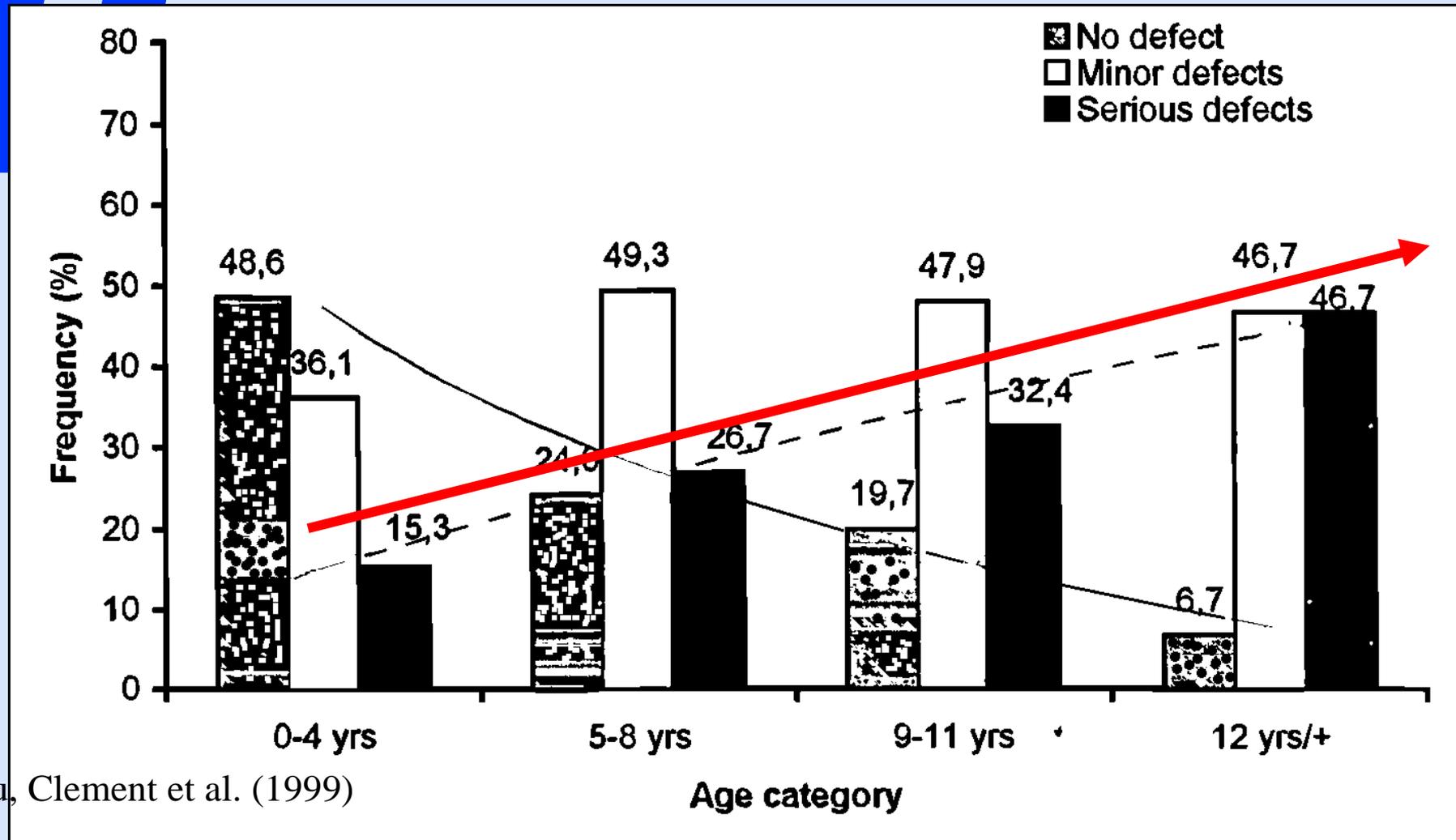
Tractor lights



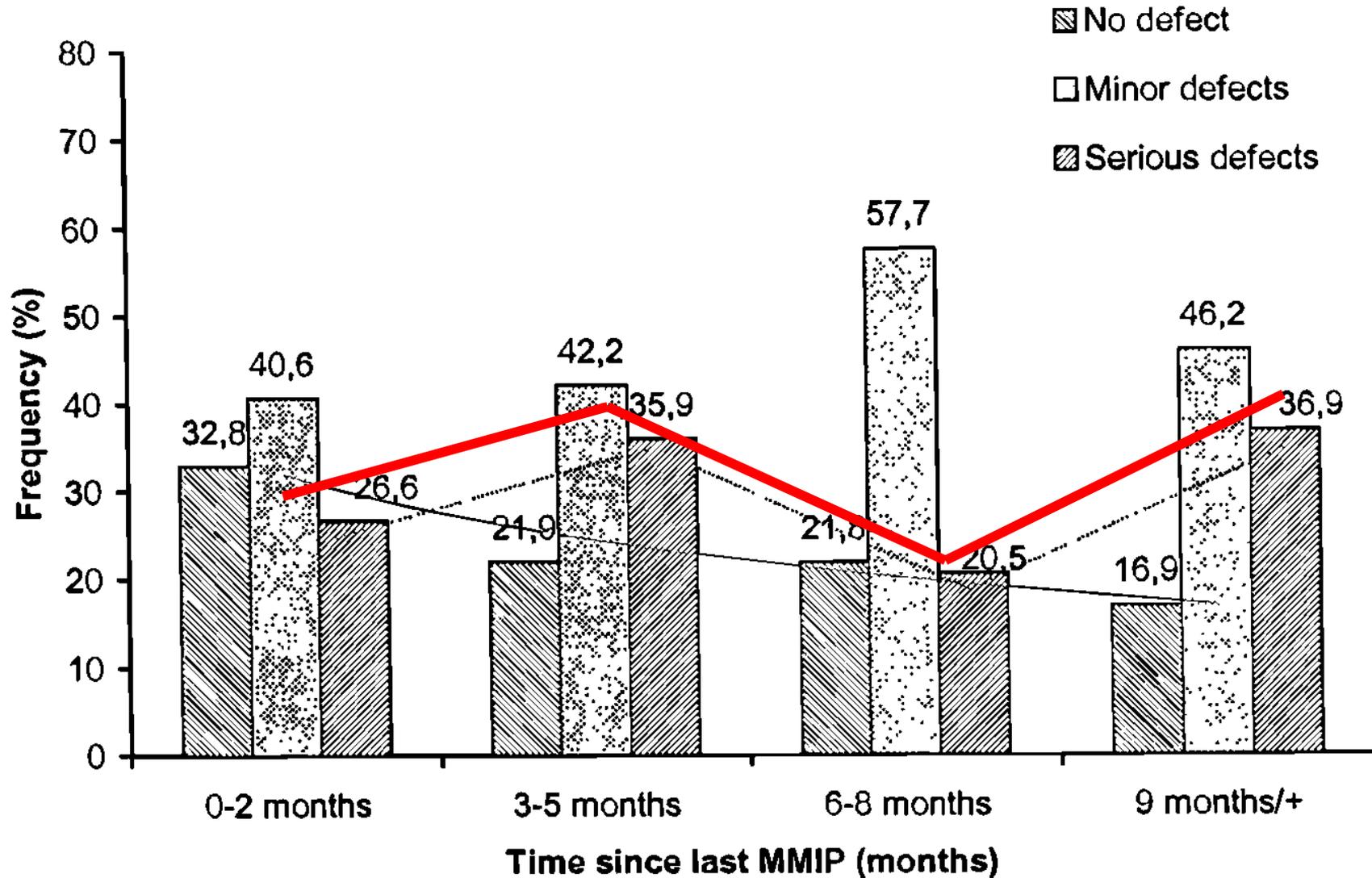
Tractor other items



The older the vehicle the higher the chance of it having a defect



For older vehicles time since last inspection has little effect on condition



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CoF inspections

- **Newer vehicles preventive effect of up to 3 months after CoF inspection**
- **Older vehicles limited benefit, restricted to low mileage vehicles**

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NZ reliance on CoF

- **Most roadworthiness compliance resources directed towards CoF**
- **Only small proportion of vehicles receive roadside inspection or fleet audit, very few receive brake inspection**
- **Unscrupulous operators can hide behind the CoF: “defects not their fault”**
- **Effectively means Government takes responsibility for vehicle condition**

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Roadside inspections

- **Greatest benefit from roadside inspection is from threat of removal from the road.**
- **Major part of North American programme**
- **Being introduced across Europe**
- **Benefit to cost ratio of 1.6:1 in USA**



Operator Safety Rating Scheme

- **Compliance audits to rate operators has 4.2:1 benefit cost ratio in USA**
- **Benefit long term through encouraging better practice and threat of removal**
- **Benefits safety and can lead to reduced vehicle operating costs**

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Industry Standards

- **Means of encouraging better practice**
- **Can also be used for rating purposes**
- **Needs to be easy to use**
- **NZ standards being developed based on international best-practice**



Components of Roadworthiness Industry Standard

- **Daily check by driver**
- **Fault recording and reporting**
- **Fault repair management**
- **Periodic maintenance**
- **individual responsibilities (driver, in-house and contractor staff etc)**
- **Record keeping and monitoring**
- **Training and education**

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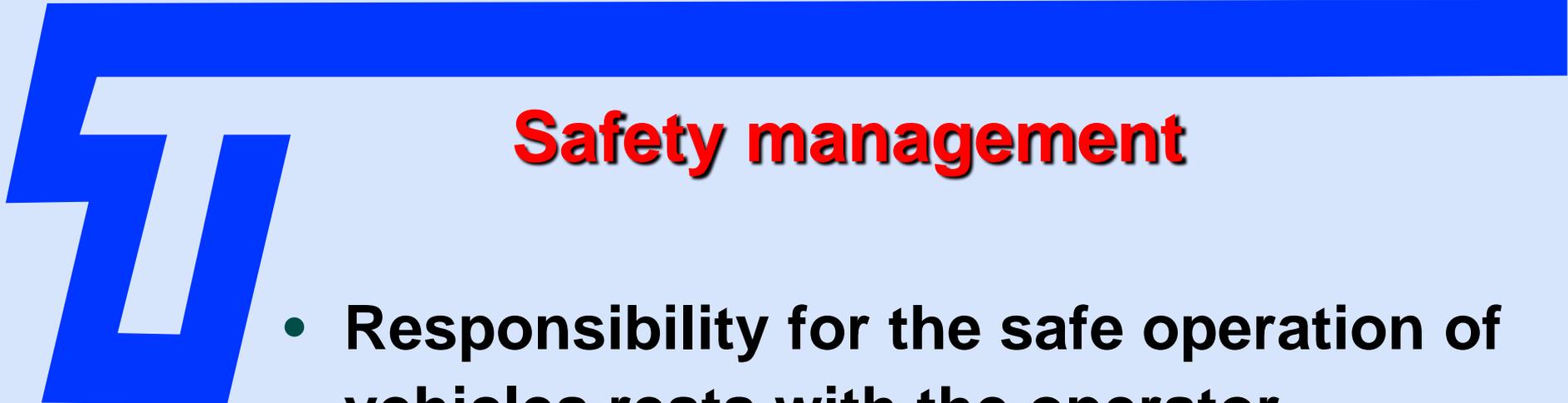
Conclusions

- **Major shift internationally towards the systems (safety management) approach**
- **Accepts that humans make errors**
- **Defences required to minimise the number of errors and to mitigate their effect if they do occur**

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Roadworthiness

- Vehicle defects contribute to 13% of crashes
- Over half are brake related
- CoF has little influence on the condition of older vehicles
- Preventative benefits of CoF gone within 3 months after inspection



Safety management

- **Responsibility for the safe operation of vehicles rests with the operator**
- **Industry Standards being developed as part of the Operator Safety Scheme**